



SludgeHammer®

nature called. we answered.



commercial
& industrial



communities



marine



residential

1.800.426.3349

Model S-400/600
NSF/ANSI Standard #40



The latest
advance in
wastewater
treatment

**Installation
Instructions**



SludgeHammer®

nature called. we answered.

Congratulations!

You have just purchased one of the most advanced and economical wastewater treatment systems on the market. The SludgeHammer® is the logical extension of our earlier technology that revolutionized the homeowner septic industry. Steady advances in design and experience with our innovative ABG (Aerobic Bacteric Generator) technology allows us to provide advanced treatment for residential, plus the heavy organic loads of restaurants and businesses.

The remarkable efficiency we can attain using our specially designed SludgeHammer® Bacterial Blend reduces energy costs, the need for sludge pumping and insures that the treatment process will be safe and dependable. Odors are eliminated. And now, treated effluent can be reclaimed for landscape irrigation. Your system will not be polluting the groundwater and nearby lakes and streams. The ease of maintenance means that SludgeHammer® Group Ltd. will be able to keep your system running smoothly.

Now certified by NSF International as a Class 1 advanced treatment system under their NSF-40 Standard, the SludgeHammer® is recognized throughout the nation as a system that can make non-conforming or difficult sites suitable for home construction.

Thanks! from the folks at
SludgeHammer® Group Ltd.

What You'll Need to Install the SludgeHammer® Unit:

- ☐ Shovel & rake
- ☐ Hand saw and tape measure
- ☐ 7/8" hole saw/drill bit
- ☐ Phillips screwdriver and wrench
- ☐ Primer and glue
- ☐ 1/2" PVC schedule 40 pipe
(amount based on location of tank)
- ☐ Multiple 1/2" PVC 90-degree elbows
(dependent upon site layout)
- ☐ 1/2" PVC tee or elbow for
bacterial catalyst assembly handle
- ☐ 1/2" quick connect union (optional)
- ☐ Mastic
- ☐ Riser (if none on septic tank)



Unpacking the SludgeHammer®

Unpack the SludgeHammer® unit and check for signs of damage. If you see any damage, contact us immediately at **1-800-426-3349**. Remove the threaded rod from the top of the unit—this rod is a shipping aid and is not to be installed with the unit.

Your package should contain the following items:

- ☐ S-400/S-600
- ☐ Rope
- ☐ SludgeHammer® Blend Bag & Assembly
- ☐ Flex & Fittings



For NSF-40 Models S-400 & S-600

The NSF-40 kit for the S-400/S-600 models accompanies the SludgeHammer® in a separate package. It should consist of the following separate items:

- Matrix Curtain
- Matrix Stack
- Matrix Float
- Effluent filter
- Alarm Box & Control Panel

The S-600 model also includes an extra aerator and associated Matrix Float.

General Guidelines

The instructions here are for typical installation for loads of up to 400 gallons per day (Model S-400) and 600 gallons per day (Model S-600). These instructions are general. Some installations may have differing additional requirements due to particular site conditions. Please complete the SludgeHammer® Site Evaluation Form prior to installation. The form is available from your local SludgeHammer® distributor or by calling SludgeHammer® at 1-800-426-3349.

Septic Tank Requirements

Tanks—

The S-400/S-600 models of SludgeHammer® require different minimum sized septic tanks for installation.

S-400

- 1,500 gallon two-chamber tank
- 1,000 gallon chamber 1
- 500 gallon chamber 2
- Lid above inlet of chamber 1
- Lid above outlet of chamber 2

S-600

- 2,000 gallon two-chamber tank
- 1,333 gallon chamber 1
- 677 gallon chamber 2
- Lids above inlet and outlet sides of chamber 1
- Lid above outlet of chamber 2



Septic Tank Requirements

-continued

Riser—

The riser will provide access to the unit for future inspections and maintenance. If there are no risers on the septic tank, expose the top of the septic tank so riser (not provided) can be installed. Risers need to be approved by the local authority and installed per manufacturer's instructions. The lid should be secure to prevent unauthorized access and have provisions for safe access. Install the riser over the septic tank opening where the unit will be installed. To be effective, you will need just enough riser to allow for the 1/2" air line assembly, as well as enough height to reach grade.

Location of the Unit—

The SludgeHammer® unit and all Matrix assemblies are placed in chamber 1. The effluent filter is placed on the outlet of chamber 2.

Location of the Air Pump and Alarm

One or more basins are used to house the air pump or pumps necessary for the system, depending upon the model number. The basin/basins should be placed in a convenient location anywhere between the house and the treatment tank. If a basement, garage or shed is available, the air pumps can be installed without the basin. In this event the alarm should be placed at a visible location, preferably on the side of the house nearest the treatment system.

The pumps should be located near an electrical source, preferably in the shade.

See **APPENDIX** for wiring.

Install Air Line from the Air Pump to the Riser

- Dig a 4 to 6" wide by 8 to 12" deep trench from the air pump to septic tank riser (local requirements may vary). (**Figure 1**)
- Drill a 7/8" hole through the riser at or near the bottom of the trench. Install a 1/2" PVC Sch 40 pipe (not provided) through the hole so that it extends into the riser at least 12". This PVC pipe is the air line that will connect the air pump to the SludgeHammer® unit. The area where the air line enters the riser must be sealed with mastic or by similar means. (**Figure 2**) For the Model-S-400, the air pump is installed as usual.
- For the Model S-600, the air line within the riser should have a tee installed with two ball valves downstream of the tee so air can be delivered and air flow regulated between the SludgeHammer® unit and the additional air diffuser.
- Do not allow dirt or other contaminants to enter the air line. Additional fittings and pipe may be required depending on the location of the pump.



Figure 1: Trenching to riser.



Figure 2: Bringing air line to riser.

Install the Units in the Septic Tank



Figure 3

NSF-40 Matrix Components—

The following describes the sequence for the installation of SludgeHammer's® NSF-400-600 models:

- **Assembly of the Matrix Curtain:**

Remove the matrix curtain assembly from the box. (Figure 3) This will consist of the blue matrix material and lengths of PVC pipe, plus the vortex spring assembly. (Figure 4)

Connect the pipes so that the pipe that contains the spring is the center section. (Figure 5)

After assembling the pipe, unfold the matrix materials and thread the pipe through the material loops at the top of the curtain. (Figure 6)

—continued on next page



Figure 4



Figure 5



Figure 6

Install the Units in the Septic Tank (continued)

NSF-40 Matrix Components (continued)—

Then fold the curtain in half by bending at the spring and gather (do not roll) the weighted ends up to the PVC top rod. **(Figure 7)**

Now the curtain is ready for insertion into the septic manhole riser. **(Figure 8)**

Make sure that the spring vortex section of the PVC pipe points toward the outlet chamber. Allow the curtain to unroll and the matrix to descend into the water. Manipulate the curtain such that the flotation pipes spread toward the sides of the tank and that the point of attachment of the floats is near the center of the baffle separating chamber 1 from chamber 2. **(Figure 9)**

- The Matrix Float is then inserted into the chamber in the open area between the leaves of the curtain as near to the outlet end as possible. Arrange so that the flotation pipe extends across the tank. The unit is designed to be free-floating so do not worry about connecting it to anything. **(Figure 10)**
- For Model S-600, the Matrix Float is larger and is associated with the extra air diffuser that is included. The Matrix Float should be loosely tethered to the air diffuser with the attached lead lines.
- The Matrix Stack comes as a separate unit that is connected to the top of the SludgeHammer® column as follows— **(Figure 11)**



Figure 7



Figure 8

Install the Units in the Septic Tank (continued)



Figure 9:

SludgeHammer® Column—

- The Matrix Stack should be tethered so that the top sheet of the stack floats immediately at the surface of the water in the tank. This means that the tethers that extend down out of the stack need to be attached at the appropriate length. **(Figure 11)**

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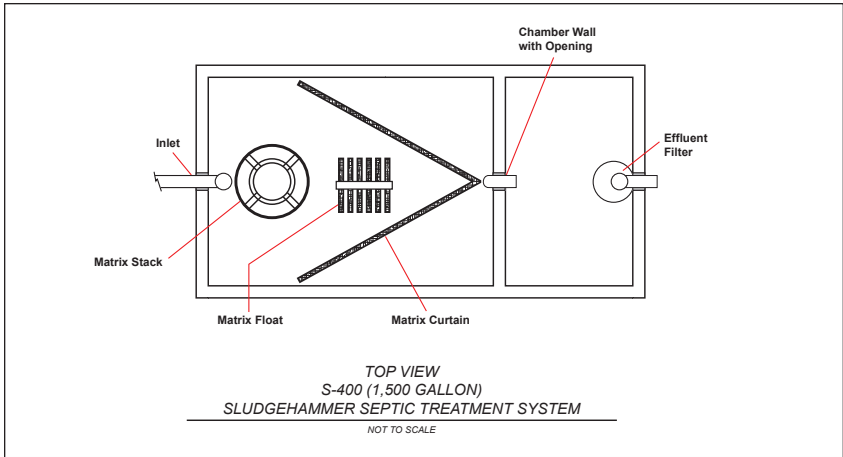


Figure 10:



Figure 11:



Figure 12:

SludgeHammer® Column (continued)—

For instance, in a tank with 52" water depth the SludgeHammer column is 36" high, the Matrix Stack is 13-5/8" thick so that the tethers should be approximately 2-3/8" in length, total equaling 52". For tanks that are shallower than 50", the stack will rest on the SludgeHammer® column but that will not affect performance. (**Figure 12**)

- Remove the threaded rod that passes through the top of the SludgeHammer® column. This is for shipping purposes only and should be discarded.
- After attaching the Matrix Stack to the SludgeHammer® column, take the rope that is included with the unit and tie it to the SludgeHammer® column so that it passes upward through the central holes in the Matrix Stack unit. Use this rope to lift and lower the SludgeHammer® column and Matrix Stack into the tank. (**Figure 13**)
- Anchor the rope to the ground with a stake or other means so that it does not fall into the tank while completing the air line assembly.
- To complete the air line assembly, cut the two PVC pipes to the appropriate length. Make a glued connection with a 1/2" PVC 90 (not provided). (**Figure 14**)
- If installing a quick connect union (recommended), cut the horizontal pipe to a shorter length allowing for the extra connection.

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Figure 13:



Figure 14:



Figure 15:

Install the Units in the Septic Tank (continued)



Figure 16:

WARNINGS

All electrical installations are to be completed according to local codes and ordinances. All electrical work is to be done by a qualified electrician.

Never enter an empty septic tank. Septic gases are extremely hazardous and can cause death. Detectable and non-detectable poisonous gases will remain in the empty septic tank.

Do not breathe septic gases while working around open septic tanks. Exposure to methane and hydrogen sulfide can be harmful.

SludgeHammer® Column (continued)—

- Remove The SludgeHammer® Blend Bag & Assembly from the packaging. Glue a 1/2" PVC Sch 40 pipe (not provided) into the coupling end of the SludgeHammer® Blend Bag & Assembly creating an extension. The extension should be long enough to extend up into the riser when the Bacterial Catalyst Assembly is set down into the installed unit.
- Cut the PVC pipe to a length so that it is a few inches below the lid of the riser and glue on a 1/2" PVC tee or elbow (not provided) as a handle. This facilitates the removal and replacement of the SludgeHammer® Blend Bag & Assembly.
- Slide the PVC extension with the SludgeHammer® Blend Bag & Assembly down the center PVC pipe of the Unit. **(Figure 15)** Do not force the SludgeHammer® Blend Bag & Assembly into the unit. As long as it is submerged within the air column in the unit then it is positioned correctly.
- Tie off the excess rope from the unit to the horizontal air line pipe. **(Figure 16)**
- Remove central component from Best Effluent filter and glue or attach with a flexible coupler to the outlet pipe of second chamber of the septic tank. After filter body is set, insert the central component back into the filter and close septic tank lid.
- Install a high water alarm float in the outlet chamber and extend sensor wires out to Alarm/Control Box.

Start Up the Unit

- Plug the air pump into outlet and make sure it begins to operate. (Be sure all basin connections comply with local codes.)
- Check all PVC pipe and fitting joints for evidence of air leaks. Make sure liquid over the unit is being actively agitated and aerated and that the SludgeHammer® Blend Bag & Assembly is submerged. (**Figure 17**)
- Some odors might become noticeable, but typically subside within 24-hours. If odors are apparent within the house refer to site evaluation page for inspection of proper plumbing and venting. Place the riser lid over the top of the riser opening to reduce exposure to gases. White PVC pipe and fittings are not UV resistant. All exposed pipe and fittings must be covered or painted (not provided).
- Install septic tank riser lid. Make certain all lids are tight.
- Backfill trenches and bury all 1/2" PVC pipes to restore the landscaping. (**Figure 18**)
- Follow-up inspections are recommended between the first and third week after start-up.
- After start-up of the unit, a foam or bubbly flock may occur in the tank within a week or two. This foam is harmless and is a sign of healthy bacterial activity. It will dissipate over time.



Figure 17:



Figure 18:

Background and Guidelines for Operating a SludgeHammer® System

Proprietary bacteria are introduced at start-up of the system within the bacterial catalyst, which is replaced as part of the annual maintenance. Several billion bacteria spores are contained within the bag. Unlike a conventional anaerobic septic tank, the proprietary bacteria in combination with the air-enriched effluent, break down the solids within the septic tank. The proprietary bacteria is robust and capable of adapting to a wide variety of conditions and moderate abuses, but the bacteria perform best when care is given to what you put into your septic system. The SludgeHammer® Blend Bag & Assembly can be safely handled. As a precautionary measure, SludgeHammer® recommends washing one's hands after handling this part of the product.

Operation Guidelines

The following are recommended guidelines to follow after the installation of the SludgeHammer®. These guidelines are within the normal suggested septic system guidelines for the standard conventional septic system.

-
- Household cleaning products or chemicals should be discharged down the drain into the septic system sparingly. Typically available household cleaning products can normally be used. Cleaning products containing disinfectants, pesticides or products that make claims they kill bacteria should be used sparingly.
 - Laundry soap and detergents with bactericides should also be avoided. Laundry should be spaced out over the week. If bleach is going to be used, choose a powdered bleach. If possible, do no more than one load a day when using bleach.
 - Products labeled “natural, organic and biodegradable” still can be toxic; toxic compounds are found everywhere in nature. Read the labels carefully and avoid products that claim to “kill bacteria.”
 - Water softeners may cause problems for a septic system if the backwash discharges into the septic tank. High concentrations of salt discharged into the septic tank can raise the PH in a system upsetting the bacteria. This is cause for concern in a septic system with or without Sludgehammer®. Keep your water softener maintained in accordance with the manufacturer.

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Operation Guidelines (continued)

- The unit can be damaged or clogged by non-biodegradable items or materials that enter the septic system, including but not limited to, any items made of rubber, latex, plastics or metals, sand or soil from non water-tight septic tanks, etc. It is important to keep such items out of the onsite wastewater treatment system.
- Prescription drugs, including but not limited to: antibiotics, chemotherapeutic and immune system suppression drugs, can have a devastating effect on any bacteria community within a septic tank or SludgeHammer® unit. If anyone within the home is using these types of drugs then notify your local certified installer or maintenance inspector for an additional service visit to check the system. It may be necessary to inspect the tank frequently for signs of trouble.
- Additional materials that should not be allowed in a septic system include, but are not limited to, automotive products, petroleum products, pesticides, paint or paint thinner, solvents, etc.
- If the home is unoccupied for any extended period up to two months or if the unit is in a septic tank serving a vacation property that is periodically occupied, leave the air pump operating. Service intervals should be scheduled for the start-up period of each season when possible.
- If a vacation home is closed up after the vacation season and the system will be unused for more than two months, unplug the air pump. When the vacation home is occupied the next season, have the service provider install a new bacterial catalyst, and plug in the air pump. The system will restart without additional oversight.
- If power is lost for up to six days where the air pump is not functioning, then the septic system should function without problems. Should the power remain out for an extended period of time, then contact your local certified installer or maintenance provider for an additional service visit to check the system.

**IF THERE ARE ADDITIONAL QUESTIONS contact your local
Certified SludgeHammer® Installer or Maintenance Inspector.**

APPENDIX

The following instructions detail the appropriate installation procedures for the Air Pump Basin assembly. This is an option when there is not an appropriate location to install a pump within a nearby structure, such as a garage or basement. The Air Pump Basin must be vented to supply air to the pump and for cooling. The following are recommended as the minimum requirements for maintaining the life of the air pump.

Air Pump Requirements

The Air Pump can be located in a garage, shed, basement or other suitable structure. When these are unavailable or impractical it can be located in the plastic basin supplied by SludgeHammer®. Locate the basin as close as possible to an electrical source in a shady spot. Burying the basin over one-third of its height is not recommended, since there is potential for moisture, condensation or water to collect in the basin. These conditions can cause the air pump to malfunction.

Connect Basin Air Line to Air Pump

The SludgeHammer® package includes a clear tube air pump connector with two hose clamps, and a barbed glue fitting connected to a PVC 90-degree elbow. Please locate and set aside.

- Cut a PVC close nipple and glue into the female adapter. Take the Air Pressure Sensor tee and glue it to the close nipple. Add a second close nipple and glue into the Air Pressure Sensor tee. **(Figure A1)** Make certain the threaded barb adapter on the clear tube air pump connector is tightly threaded into the PVC 90-degree elbow (provided). Tighten the hose clamp on the barb end (provided). Position the air pump in the center of the basin. **DO NOT GLUE THIS CONNECTION NOW!** Estimate the correct length for the clear plastic tubing to make sure it does not kink and cut to length.
- Remove the air pump and the clear tube connector. Put the second hose clamp (provided) over the open end of the clear plastic tube, slide the tube over the outlet port of the air pump and tighten the hose clamp.
- Reposition the air pump within the basin, now connected to the clear tube connector, slip the PVC 90-degree elbow over the close nipple to insure that the clear tube is not kinked, then glue the PVC 90-degree elbow onto the close nipple. **(Figure A2)**



Figure A1: Air supply pipe connection to air pump with sensor attached.



Figure A2: Air pump installed in protective basin.

Alarm/Control Box

The Alarm/Control Box should be placed in a location where the alarm light will be visible and the alarm sound can be heard. Bring the air pressure sensor wires and high water alarm float wires in the septic tank to the Alarm/Control Box. Hook both sets of sensor wires to terminals 1 and 2 per the electrical schematic. (**Figure A3**)

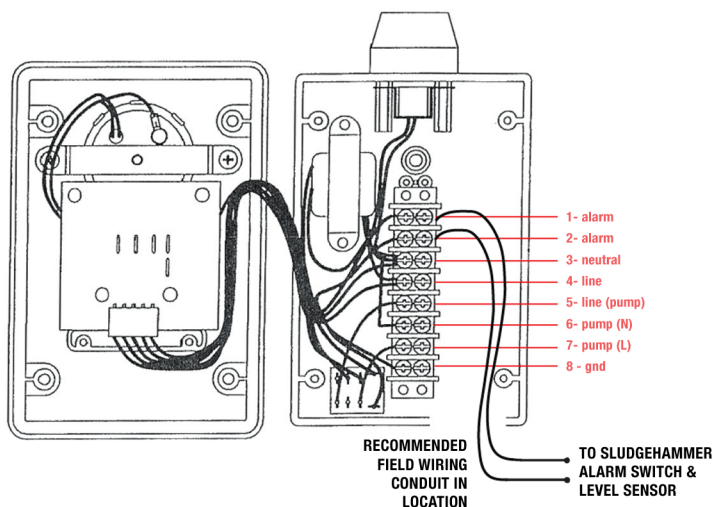


Figure A3: Electrical connections inside the Alarm/Control panel.

Make Electrical Connection to Basin and Air Pump

Note: Hire a qualified electrician to wire a GFCI protected connection to the air pump.

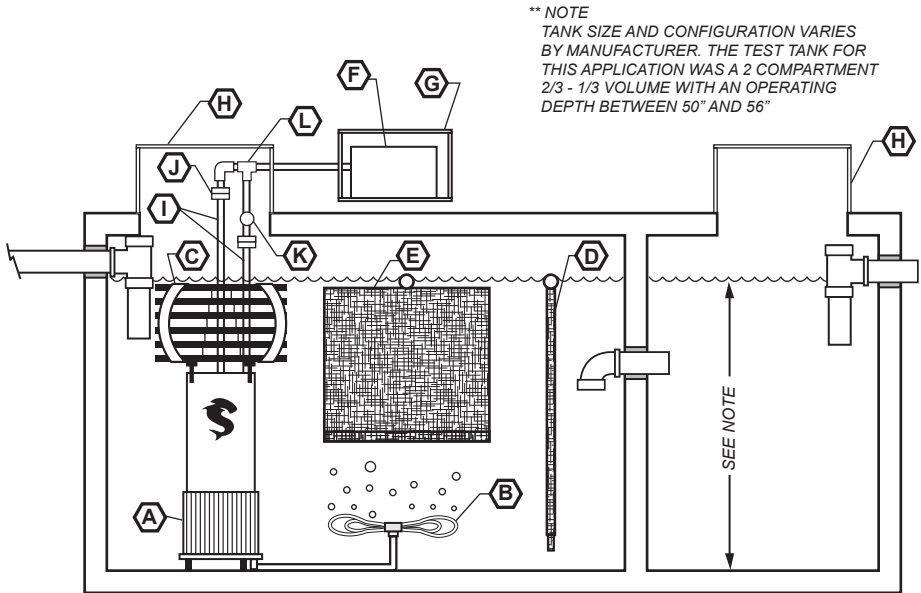
Suggested Electrical Conduit Assembly

Required components:

- 1/2" Carlon (or similar) gray electrical male adapter
 - 1/2" Carlon (or similar) PVC entry elbow
 - 1/2" PVC Sch 40 pipe
 - 3/4" barb end spade bit
 - EMT lock nut
 - Wet or dry PVC glue
- Install a 1/2" Carlon (or similar) gray electrical male adapter (not provided) by drilling another 3/4" hole, typically at 90 or 180 degrees from the air line connection male adapter. Follow the same procedure as the air line male adapter installation, except use an EMT lock nut on inside of the basin instead of the female adapter.
 - Cut a close nipple approximately 1-1/2" long from 1/2" PVC pipe (not provided) and glue it into the Carlon male adapter. Glue a 1/2" Carlon PVC entry "L" (not provided) onto the close nipple in the position best suited to connect to the electrical service. Leaving it unglued for the electrician is also an option. Check to make certain the electrician properly glued this connection. **(Figure A4)**
 - The electrician can connect the electrical service to this entry or make his own waterproof connection to the basin. The electrician must connect the basin and air pump to a GFCI protected service that meets the codes and ordinances of the local authority having jurisdiction over electrical installations.



Figure A4: Entry elbow for electric.



**S-600 (2,000 GALLON)
SLUDGEHAMMER SEPTIC TREATMENT SYSTEM**

NOT TO SCALE

KEY:

- A. SludgeHammer® column
- B. Extra aerator (Used on S-600 model only)
- C. Matrix stack
- D. Matrix curtain (See TOP VIEW for arrangement)
- E. Matrix float
- F. Air pump
- G. Air pump protective basin
- H. Tank risers
- I. Air lines
- J. PVC union
- K. PVC ball valve
- L. Tee connection to airlines inside/outside riser

Side View



SludgeHammer®

nature called. we answered.

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SludgeHammer®— Putting Nature to Work. Naturally.

Septic systems have successfully treated household waste for hundreds of years. Soil absorbs the waste and microbes in the ground consume organic material. As long as there is oxygen, the microbes thrive. Without oxygen they produce biomat—a slime that clogs the soil. It is estimated that 95% of all septic system failures are caused by biomat clogging. Eliminate it and you extend the life of new leachfields or drip irrigation systems and drastically reduce the need for septic tank pumping or destructive property repair.

Enter the SludgeHammer®, an Aerobic Bacterial Generator that fosters the growth of a curative biomat of specialized bacteria right in the septic tank. As the SludgeHammer® eliminates waste in the tank, it sends out an endless stream of microbes that keep the soil open and porous. These powerful bacteria help control nitrates and fecal bacteria that contaminate the soil and nearby groundwater. Most importantly, they preserve the soil's health as long as the SludgeHammer® operates.

